

Missouri Adult Blood Lead Surveillance and Epidemiology Program Annual Report

January 1 through December 31, 2004

The Centers for Disease Control and Prevention (CDC), National Institute of Occupational Safety and Health (NIOSH) has funded states to operate the Adult Blood Lead Epidemiology and Surveillance (ABLES) program since 1987. The goal of this program is the elimination of all cases of workplace-induced blood lead elevations ≥ 25 $\mu\text{g/dL}$ (micrograms of lead per deciliter of blood) in adults by the year 2010. In 2004, 37 states were funded to collect and analyze data on cases of elevated blood lead levels in individuals age 16 years and older. The majority of lead elevations in this population are believed to be due to exposures in the workplace. Non-identifying data are reported to NIOSH by the MO ABLES program for national surveillance purposes.

All blood lead testing of Missouri residents is reportable to the Missouri Department of Health and Senior Services (DHSS) under the Missouri Code of State Regulations 19 CSR 20-20.20 and 19 CSR 20-20.80, regardless of age of the patient or blood lead level. DHSS's Office of Surveillance administers the Missouri ABLES (MO ABLES) program, which was first funded by NIOSH in Fall 2001. This report summarizes blood lead testing and elevated lead levels in Missouri residents age 16 years and older for calendar year 2004.

There were 14,287 blood specimens drawn, analyzed, and reported to the MO ABLES program for Missouri residents age 16 years and older for the period January 1 through December 31, 2004. Blood specimens drawn but not analyzed are excluded. The range of reported blood lead levels was from zero (or non-detectable) to a high of 148 $\mu\text{g/dL}$. The majority of specimens analyzed, 11,558 (80.9%) were <25 $\mu\text{g/dL}$.

Analysis of the MO ABLES 2004 data revealed 2,075 adults were tested more than once, for a total of 8,342 unduplicated individuals being tested in 2004. Of these, 7,577 (90.8%) had lead levels <25 $\mu\text{g/dL}$. There were 647 (7.8%) reported with lead levels between 25 $\mu\text{g/dL}$ and 39 $\mu\text{g/dL}$, and 118 (1.4%) whose highest level was 40 $\mu\text{g/dL}$ or above (**Figure 1**). For statistical purposes, blood lead level determination for Missourians tested more than once during the timeframe is based upon their highest reported blood lead level.

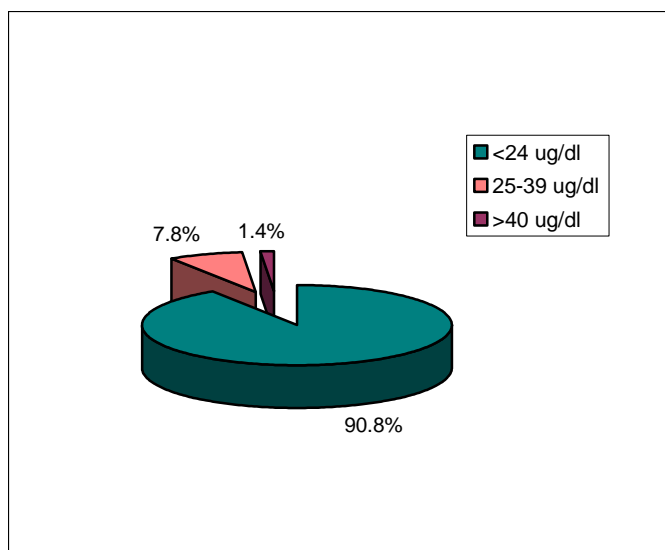


Figure 1—Missouri Adults by Blood Lead Level, 2004

In total during 2004, 765 (9.2%) of all individuals tested had at least one blood lead test at or above 25 µg/dL, the lead level of concern for non-pregnant adults. The highest level acceptable for workers by U.S. Occupational Safety and Health Administration (OSHA) standards is 40 µg/dL.

The MO ABLES program data are primarily collected through reporting by laboratories analyzing blood lead specimens. Information reported is to include patient date of birth or age, home address, gender, race, ethnicity, date of blood lead test, and laboratory results. However, laboratory data often do not include all information needed by the MO ABLES program. Missing information on individuals with blood lead levels ≥ 25 µg/dL is sought by contacting medical providers and employers; therefore, data on non-elevated adults are more likely to be incomplete in the MO ABLES database.

The following data analyses were performed on the data set consisting of only the 765 individuals with at least one blood lead level ≥ 25 µg/dL during calendar year 2004.

Of the 765 adults with elevated blood lead levels tested in 2004, the majority (757, 99.0%) were between 18 and 64 years of age at the time their blood specimen was drawn. During this time frame, there was also 1 (0.1%) elevation in the 16 to 17 year-old age range, and 7 (0.9%) adults 65 years or older and with an elevated blood lead level. **(Figure 2).**

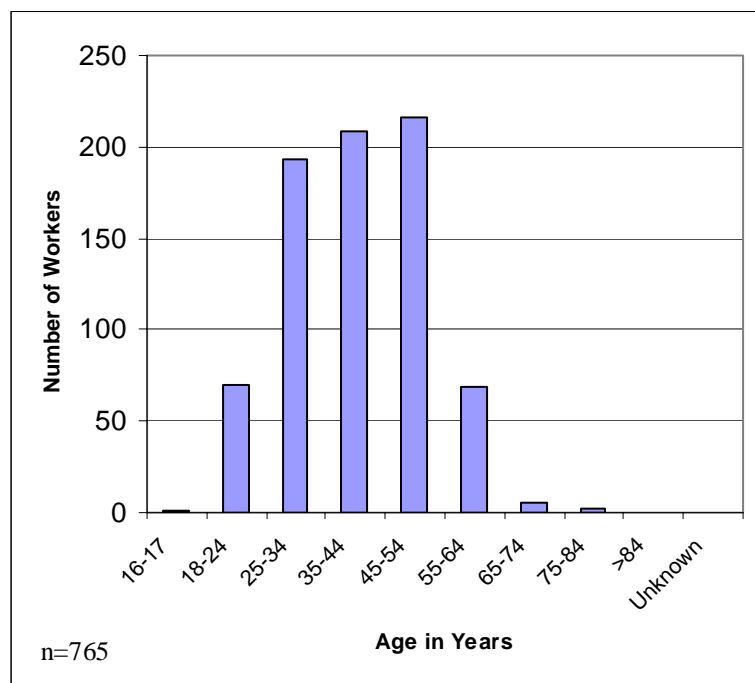


Figure 2—Adults with Elevated Lead Levels by Age, 2004

Figure 3 illustrates that 708 (92.5%) adults with elevated lead levels were male, females comprised 55 (7.2%), and 2 (0.3%) were unknown sex.

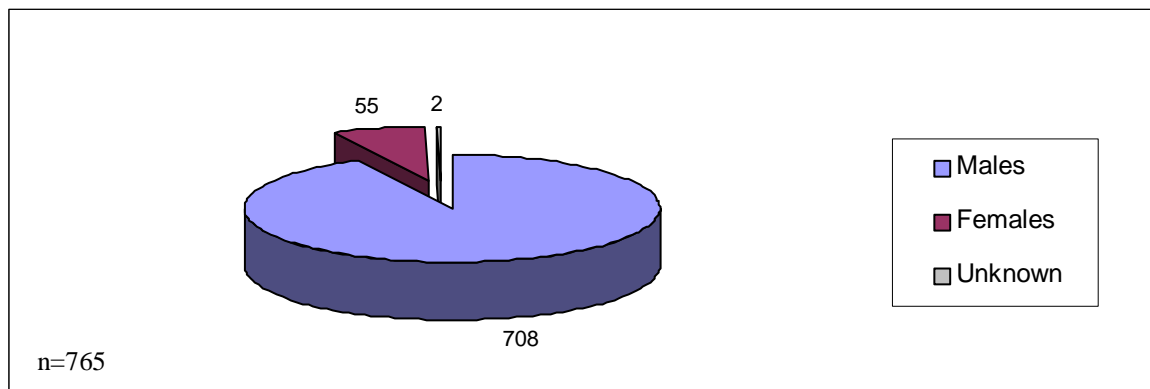


Figure 3—Adults with Elevated Lead Levels by Sex, 2004

Race and ethnicity information is sought for all adults with elevated lead levels. MO ABLES staff find that many medical providers and employers do not have this information available about their patients and workers. For the 479 (62.6%) individuals with a reported race, 455 (95.0%) were White, 20 (4.2%) were Black, 3 (0.6%) were Native American or Alaskan Native, and 1 (0.2%) was reported as Asian or Pacific Islander. Of 396 (51.8%) elevated adults with a reported ethnicity, 389 (98.2%) were Non-Hispanic and 7 (1.8%) were Hispanic. However, as indicated in **Figures 4 and 5**, race and ethnicity are not known for many adults with elevated lead levels.

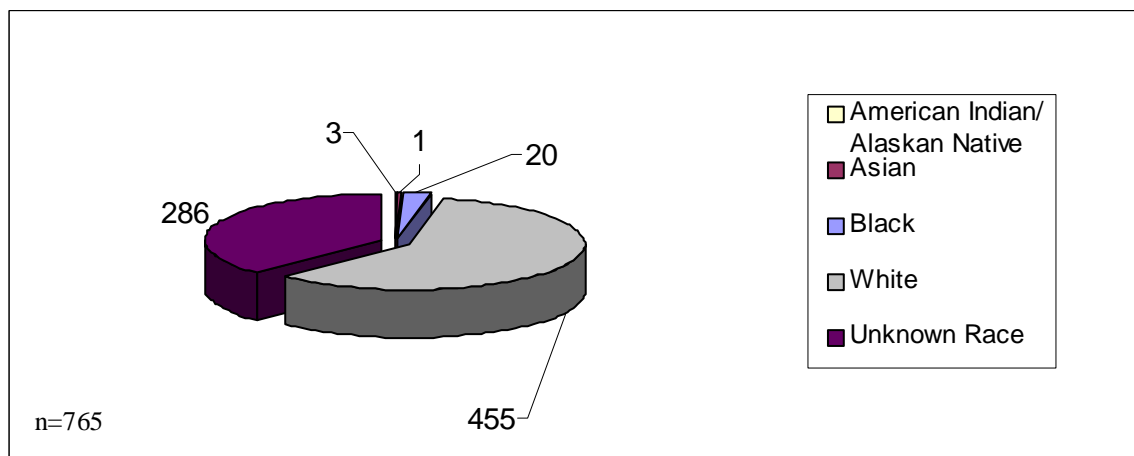


Figure 4—Adults with Elevated Lead Levels by Race, 2004

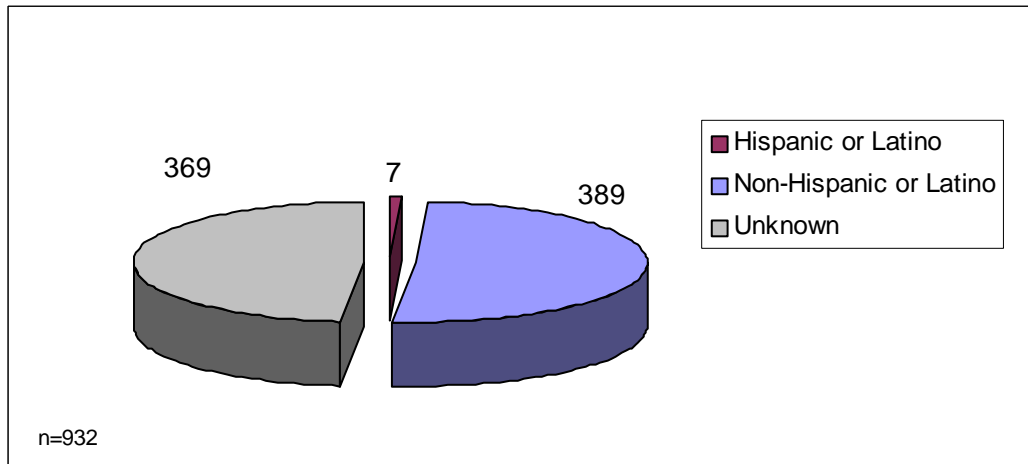


Figure 5—Adults with Elevated Lead Levels by Ethnicity, 2004

Of the 765 individual records with blood lead levels ≥ 25 $\mu\text{g/dL}$ drawn in 2004, 728 (95.5%) have a known employer and Standardized Industry Code (SIC). Six industries represented 694 (95.5%) of the workers whose records had a SIC code. Metal mining (SIC 1031), which is the industry employing 526 (72.3%) lead-elevated workers in 2004, is conducted in Dent, Iron and Jefferson counties. The industries with the largest numbers of lead-elevated employees are shown in **Figure 6** and **Table 1**.

A worker's place of employment is assumed to be their source of exposure unless other source information, such as an exposure by hobby, is received.

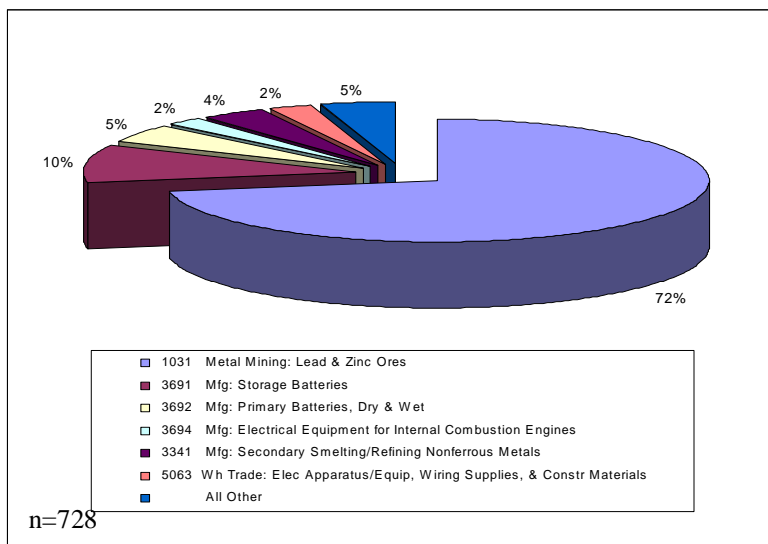


Figure 6—Industries with Lead-Elevated Workers, 2004

Table 1— Lead-Elevated Workers by Industry, 2004

<i>SIC Division</i>	<i>Standard Industry Code (SIC)</i>	<i>SIC Activity</i>	<i># Workers Elevated \geq 25 ug/dl</i>
Metal Mining	1031	Lead & Zinc Ores	526
Manufacturing	3691	Storage Batteries	72
Manufacturing	3692	Primary Batteries, Dry & Wet	35
Manufacturing	3341	Secondary Smelting & Refining of Nonferrous Metals	27
Wholesale Trade	5063	Electrical Apparatus & Equipment, Wiring Supplies, & Construction Materials	18
Manufacturing	3694	Electrical Equipment for Internal Combustion Engines	17
Various	Various	All other Standard Industry Codes combined	33
Total			728

Lead battery manufacturing, mining, smelting, and other related industries are an important part of Missouri's economic base. Some of the world's largest known lead deposits are located in Missouri, and mining has been ongoing since the 1700s. While lead is a great economic resource, lead in the human body is a health hazard. Missouri's largest lead industries provide community education and services, and they test their employees according to OSHA requirements. These companies also cooperate in providing demographic information to aid the MO ABLES program in data collection.

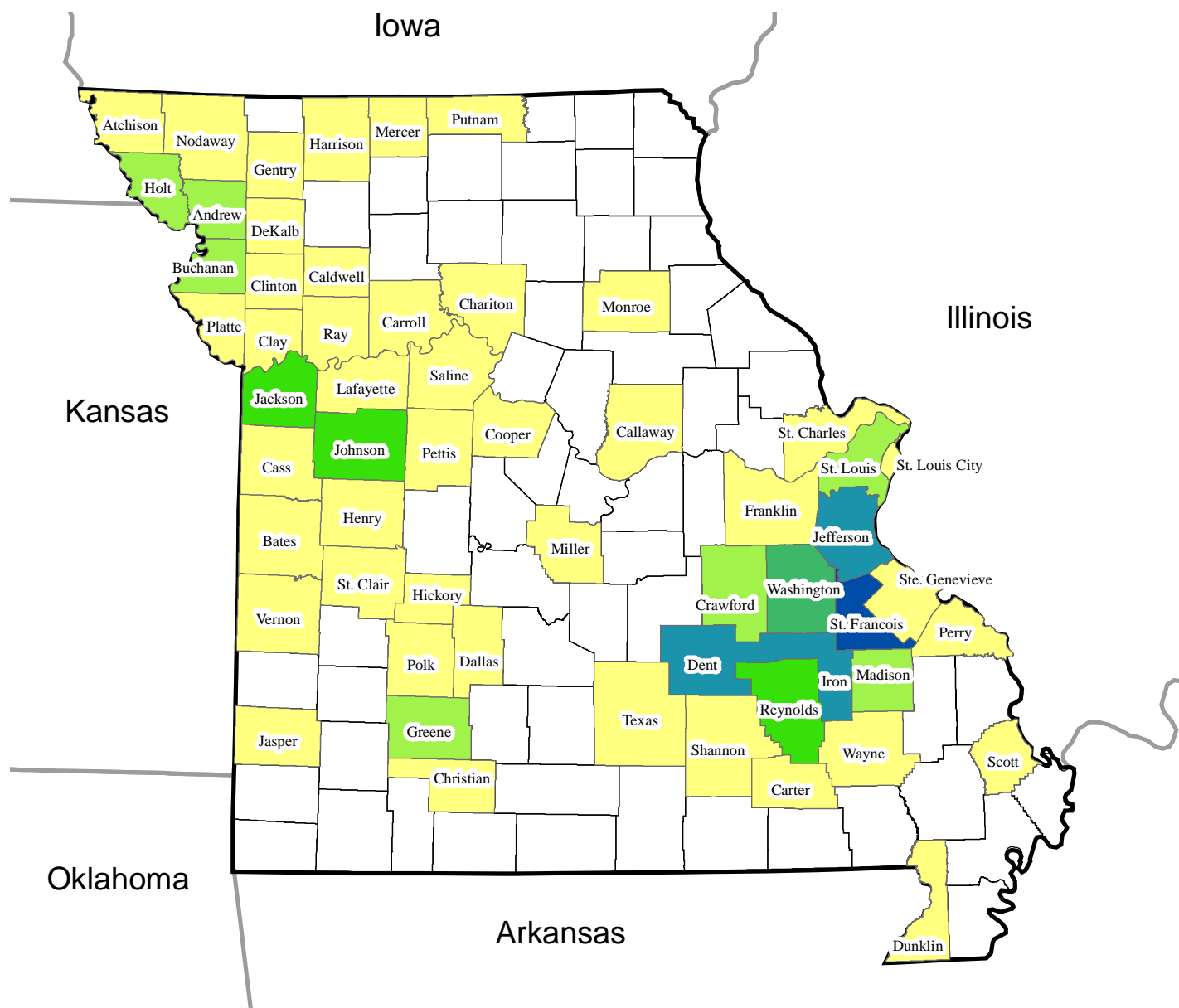
There were 14 records for lead-elevated adults without an identifiable employer or SIC code, but for whom an occupation or other source was known. These sources included painting (4), repairing automobiles/radiators (2), non-specific construction/renovation (3), bullets lodged in body (2), ceramics hobby (1), factory work (1), and residing in a home with lead-based paint (1). Employment or source information on 23 individuals was not available, including three persons for whom their physician could not determine the cause of the lead elevation, and one suspected false positive or misreported lead level.

The MO ABLES database includes 727 (95.0%) records with a known county of employment for the 765 individuals with a blood lead elevation in calendar year 2004. Workers who are employed out of state are included in the MO ABLES data if they are known to reside in Missouri. Of the 727 lead-elevated workers with a known address of employment, 51 (6.7%) individuals were working in another state. There were 17 Missouri counties (including St. Louis City) where workers with a blood lead elevation ≥ 25 mg/dl were employed in 2004. There were 42 (5.5%) Missouri residents with elevated blood lead levels who were employed in Kansas, 4 (0.5%) 3 (0.4%) in Iowa, and 2 (0.3%) in Wisconsin ([Map 1](#)).

As shown by [Map 2](#), many workers commute across county boundaries to reach their places of employment. Analysis of this trend is impaired because reported information often does not include a worker's home address to compare with employment address data. Of the 761 elevated workers for 2004 with a known county of employment, 745 (97.9%) included a county of residence. While workers with known lead elevations live in 57 of Missouri's 115 counties, their places of employment are concentrated in only 21 counties, 4 of which are out-of-state. Of the 765 workers with elevated blood lead levels in 2004, 662 (86.5%) are both employed and live in the state of Missouri.



Missouri ABLES Calendar Year 2004: Elevated Blood Lead Levels 25 ug/dl or Greater By County of Residence



A total of 761 workers had elevated blood lead levels of 25 ug/dl or greater. Sixteen (16) workers did not list a county of residence.

Total Per County

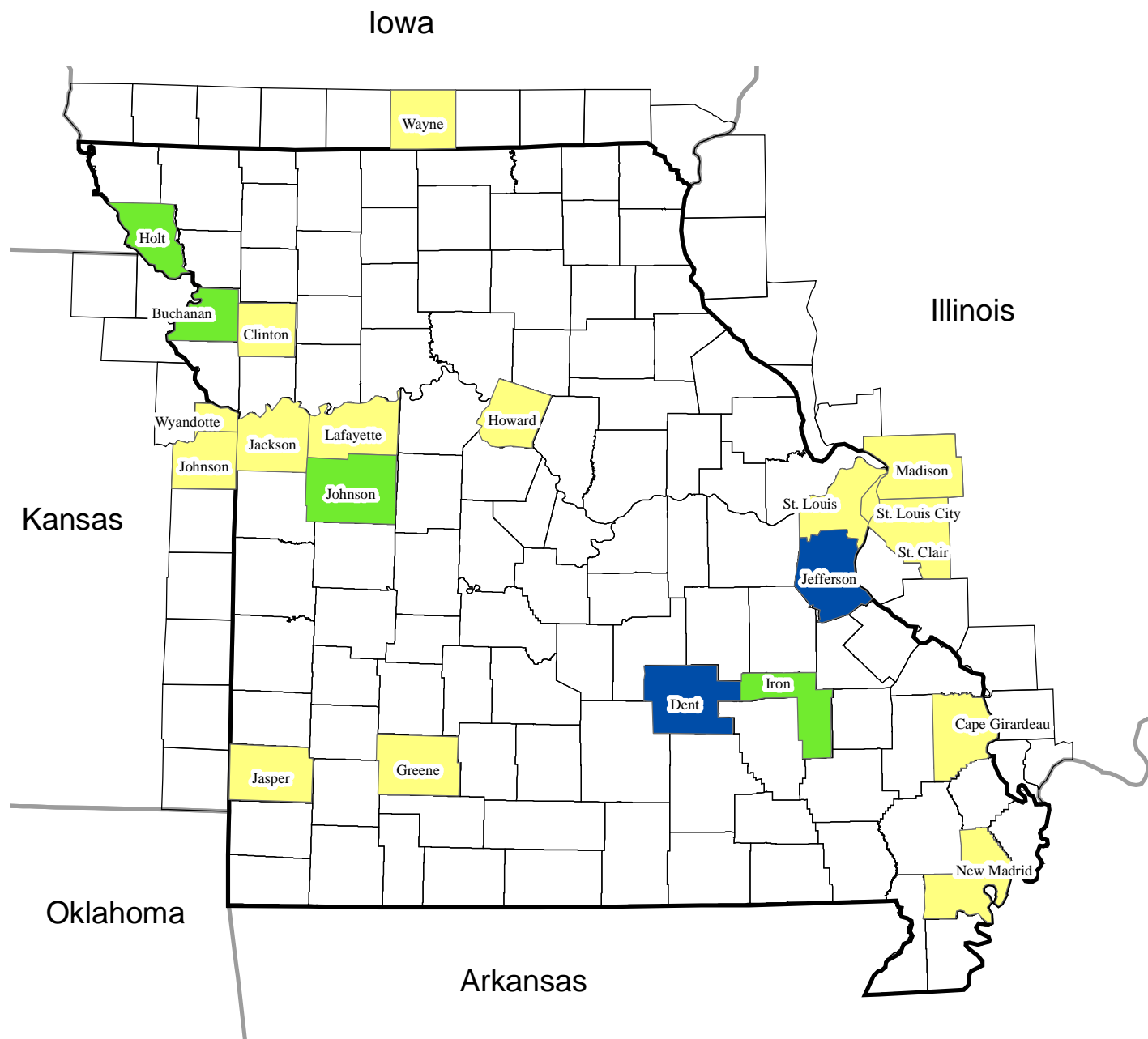
1 - 10	71 - 90
11 - 30	91 - 110
31 - 50	111 - 130
51 - 70	

0 30 60 120 Miles

Source: Missouri ABLES 2004



Missouri ABLES Calendar Year 2004: Elevated Blood Lead Levels 25 ug/dl or Greater By County of Employment/Exposure



A total of 761 workers had elevated blood lead levels of 25 ug/dl or greater. Two (2) workers are employed in Wisconsin. Thirty-four (34) workers did not list a county of employment/exposure.

Total Employed/Exposed

1 - 25	76 - 100
26 - 50	200 +
51 - 75	

Source: Missouri ABLES 2004